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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/792,292	03/03/2004	Shigeru Fujii	FY.51395US0A	3156

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EXAMINER	
KENNEDY, ADRIAN L	

ART UNIT	PAPER NUMBER
2121	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/792,292	FUJII ET AL.	
	Examiner	Art Unit	
	Adrian L. Kennedy	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-52* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *11-13* is/are allowed.

6)☒ Claim(s) *1-10 and 14-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 August 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Examiner's Detailed Office Action

1. This Office Action is responsive to application **10/792,292**, filed **March 3, 2004.**

2. **Claims 1-52** have been examined.

Information Disclosure Statement

3. Applicant is respectfully reminded of the ongoing Duty to disclose 37 C.F.R. 1.56 all pertinent information and material pertaining to the patentability of applicant's claimed invention, by continuing to submit in a timely manner PTO-1449, Information Disclosure Statement (IDS) with the filing of applicant's application or thereafter.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 1-10, 14-38, and 39-52 are rejected under 35 U.S.C 101 as being directed to nonstatutory subject matter. In particular claims 1-10, 14-38 and 39-52 are considered to be directed to software and in accordance with "The Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility", Annex IV (a). It should be noted that the Guidelines provide a framework for the rejection, but it is the case law cited therein that provides the legal authority for this rejection. The claims do not set forth any structure whereby the functionality of the software may be realized. Accordingly, these claims do not define patent eligible subject matter.

Furthermore, claims 14-38 and 39-52 do not set forth a "useful, concrete and tangible result". In particular, it is not considered that these claims set forth a tangible result. Claims 14-38 and 39-52 do not produce a practical real world result.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by *Wu et al.* (*Mechatronics* Vol. 5).

Regarding claim 1:

Wu et al. teaches

A soft computing optimizer for designing a knowledge base to be used in a soft computing control of a motorcycle steering system, comprising:

a fuzzy inference engine [Page 442, Section 4; "*inference mechanism*"];

a user input module configured to allow a user to select at least one optimization parameter [P 445, S 1; "*optimal values of parameters*"], said optimization parameter comprising at least one of, a number of input variables [P 443, S 1; "*input and output variables*"] of said knowledge base [P 443, Fig. 2], a number of output variables [P 443, S 1; "*input and output variables*"] of said knowledge

base, a type of fuzzy inference model [P 441, S 3; "*computer simulation*"] used by said fuzzy inference engine, and a preliminary type of membership function [P 444, S 3; "*membership functions*"];

a dynamic simulation [P 441, S 3; "*computer simulation*"] model of a motorcycle and rider [P 441, S 3; "*rider-motorcycle*"];

a genetic algorithm [P 441, S 3; "*genetic algorithm*"] configured to optimize said knowledge base using said fuzzy inference engine to control said dynamic simulation, said genetic algorithm configured to optimize said at least one optimization parameter.

The examiner takes the position that the user input module is an inherent part of the invention of Wu et al., because with out it, the user would be unable to define the various optimization parameters.

Regarding claim 8:

Wu et al. teaches

The soft computing optimizer where said genetic algorithm [P 441, S 3; "*genetic algorithm*"] optimizes a structure of said KB [P 443, Fig. 2] when said motorcycle is maneuvered along a circular path [P 445, S 4; "*circular motion of a motorcycle*"].

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

    1. Determining the scope and contents of the prior art.
    2. Ascertaining the differences between the prior art and the claims at issue.
    3. Resolving the level of ordinary skill in the pertinent art.
    4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 2, 6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Wu et al.* (*Mechatronics* Vol. 5) in view of *Ulyanov et al.* (USPubN 2004/0030420).

Regarding claim 2:

Wu et al., as discussed above, teaches the fuzzy inference engine [Page 442, Section 4; "*inference mechanism*"], but fails to teach the fuzzy inference model comprising a Fuzzy Neural Network.

However, Ulyanov et al. does teach

The soft computing optimizer wherein said fuzzy inference engine comprises a Fuzzy Neural Network [Page 3, Section 0063; "*FNN*"; Ulyanov et al. previously sets the president that a Fuzzy Neural Network is a FNN].

It would have been obvious to one skilled in the art at the time of applicants' invention to combine the invention of Wu et al. with the invention of Ulyanov et al. for

the purpose of using an optimized control system [*Ulyanov et al.* (USPubN 2004/0030420); P 2, S 0014; "*optimized control system*"].

Regarding claim 6:

Wu et al., as discussed above, teaches the fuzzy genetic algorithm [Page 442, Section 4; "*inference mechanism*"], but fails to teach that the optimization according to a teaching signal.

However, Ulyanov et al. does teach

The soft computing optimizer wherein said fuzzy genetic algorithm is configured to optimize said knowledge base according to a teaching signal [P 1, S 0011; "*teaching signal*"].

It would have been obvious to one skilled in the art at the time of applicants' invention to combine the invention of Wu et al. with the invention of Ulyanov et al. for the purpose of using an optimized control system [*Ulyanov et al.* (USPubN 2004/0030420); P 2, S 0014; "*optimized control system*"].

Regarding claim 10:

Wu et al. as discussed above teaches the use of a fitness function [P449, S 2, "*fitness function*"] but fails to teach that the function is based on minimizing entropy production.

However, Ulyanov et al. does teach

The soft computing optimizer where said genetic algorithm uses a fitness function based on minimizing entropy production [P 1, S 0012; "*minimizing entropy production*"].

It would have been obvious to one skilled in the art at the time of applicants' invention to combine the invention of Wu et al. with the invention of Ulyanov et al. for the purpose of using an optimized control system [*Ulyanov et al.* (USPubN 2004/0030420); P 2, S 0014; "*optimized control system*"].

11. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Wu et al.* (*Mechatronics* Vol. 5) in view of USPN 6,490,237 (*Supino*).

Regarding claim 3:

Wu et al., as discussed above, teaches the fuzzy inference engine [Page 442, Section 4; "*inference mechanism*"], but fails to teach the fuzzy inference model comprising a Mamdani model.

However, Supino does teach

The soft computing optimizer wherein said fuzzy inference model comprises a Mamdani model [C 3, L 21-24; "*Mamdani-type*"].

It would have been obvious to one skilled in the art at the time of applicants' invention to combine the invention of Wu et al. with the invention of Supino for the purpose of facilitating "*fuzzy inference*" [*Supino.* (USPN 6,490,237); C 3, L 21-24; "*Fuzzy Inference*"].

Regarding claim 4:

Wu et al., as discussed above, teaches the fuzzy inference engine [Page 442, Section 4; "*inference mechanism*"], but fails to teach the fuzzy inference model comprising a Sugeno model.

However, Supino does teach

The soft computing optimizer wherein said fuzzy inference model comprises a Sugeno model [C 3, L 21-24; "*Sugeno-type*"].

It would have been obvious to one skilled in the art at the time of applicants' invention to combine the invention of Wu et al. with the invention of Supino for the purpose of facilitating "*fuzzy inference*" [*Supino.* (USPN 6,490,237); C 3, L 21-24; "*Fuzzy Inference*"].

Allowable Subject Matter

12. Claim 11 is allowed.

Claim 11 is allowable subject matter because the prior art of the record fails to teach or fairly suggest a method for optimizing a knowledge base in a soft computing controller for maneuvering a motorcycle, comprising:

selecting a fuzzy model by selecting one or more parameters, said one or more parameters comprising at least one of a number of input variables, a number of output variables, a type of fuzzy inference model, and a teaching signal;

optimizing linguistic variable parameters of a knowledge base according to said one or more parameters to produce optimized linguistic variables according to a teaching signal obtained from a dynamic simulation model of a motorcycle and rider;

ranking rules in said rule base according to firing strength;

eliminating rules with relatively weak firing strength leaving selected rules from said rules in said rule base;

optimizing said selected rules, using said fuzzy mode, said linguistic variable parameters and said optimized linguistic variables, to produce optimized selected rules.

The disclosure of *Shanahan* (USPubN 2003/0078899) teaches the optimization [P 9, S 0146; "*Powell minimization algorithm*"] of linguistic variable parameters [P 2, S 044; "*linguistic variable*"]. However, it would not have been obvious to one of ordinary skill in the art at the time of invention to combine the inventions of Wu et al. and Ulyanov et al. with the invention of Shanahan. The inventions of Wu et al. and Ulyanov et al. are both in the art of fuzzy inference systems, whereas the invention of Shanahan relates primarily to text categorization and hence the inventions are not combinable.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. Lui et al. (IEEE Transactions on Systems, Man, and Cybernetics) is cited for his model for a rider-motorcycle system using fuzzy control. Nomura et al. (USPN 5,740,323) is cited for his evolutionary adaptation type inference knowledge extracting apparatus. Furuta et al. (USPN 5,349,646) is cited for his signal process apparatus having at least one neural network. Sepe, Jr. et al. (USPN 6,711,556) is cited for is method of fuzzy logic controller optimization. Pappalardo et al. (USPubN 2002/00996730) is cited for his method of coding fuzzy logic membership functions. Ulyanov et al. (USPN 6,701,369) is cited for his intelligent mechatronic control of a

suspension system. Ulyanov (USPN 6,411,944) is cited for his self-organizing control system. Ulyanov et al. (USPubN 2002/0016665) is cited for his system for intelligent control of an engine. Ulyanov et al. (USPN 6,463,371) is cited for his system for intelligent control of a vehicle suspension. Ulyanov (USPN 6,721,718) is cited for his system for intelligent control base on soft computing. Ulyanov et al. (USPN 6,496,761) is cited for his optimization control method for a shock absorber.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adrian L. Kennedy whose telephone number is (571) 272-5933. The examiner can normally be reached on Mon -Fri 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight can be reached on (571) 272-3687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ALK

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